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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/040,526	12/28/2001	Wayne V. Sorin	005489.P010	9112

7590

01/08/2004

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EXAMINER
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WONG, ERIC K

ART UNIT	PAPER NUMBER
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2874

DATE MAILED: 01/08/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b> 10/040,526	<b>Applicant(s)</b> SORIN ET AL.	
	<b>Examiner</b> Eric Wong	<b>Art Unit</b> 2874	

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 08 October 2003.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-37 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-3,5-10 and 13-36 is/are rejected.
- 7) ☒ Claim(s) 4,11,12, and 37 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. §§ 119 and 120**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☐ All b) ☐ Some \* c) ☐ None of:  
1. ☐ Certified copies of the priority documents have been received.  
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 13) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.  
a) ☐ The translation of the foreign language provisional application has been received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

**Attachment(s)**

- |   |   |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)                                     | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s). _____. |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                            | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449) Paper No(s) <u>1003</u> . | 6) <input type="checkbox"/> Other: _____.                                   |

## **DETAILED ACTION**

### ***Response to Arguments***

1. Applicant's arguments, filed 10/08/03, with respect to the rejection(s) of claim(s) 1-5 and 10-37 have been fully considered and are persuasive. Therefore, the rejection has been withdrawn. However, upon further consideration, a new ground(s) of rejection is made in view of "Acousto-optic Superlattice Modulator Using a Fiber Bragg Grating" to Liu et al.
2. In regards to applicants arguments for claims 6-9, various modes of fibers including core, cladding and polarization and coupling those modes are basics of optical fiber technology. Attached is a title page from *Optical Fibers for Transmission* by Midwinter, 1979. If applicant should require specific pages from this reference, examiner can provide upon request.

### ***Claim Rejections - 35 USC § 103***

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.
  4. Claims 1-2, 5, 10, 13-21, 24-25, and 28-35 are rejected under 35 U.S.C. 103(a) as being unpatentable over United States Patent Number 6,181,840 to Huang et al. and further in view of "Acousto-optic Superlattice Modulator Using a Fiber Bragg Grating" to Liu et al.
- As to claims 1, 2, 5, 31, 34, 35 Huang et al. discloses a method comprising:
- Microbending a fiber Bragg grating with a transverse acoustic wave; and
- reflecting one or more Nth order sidebands of reflection wavelengths with the

fiber Bragg grating to couple a band of wavelengths within an optical signal from a first mode to a second mode (Figures 1-4 and Column 3, Lines 8-31)

- Generating the transverse acoustic wave at a first frequency and a first signal strength; and transmitting the transverse acoustic wave to an optical waveguide having an interaction region containing the fiber Bragg grating (26, Figure 4)
- As to claim 10, given the acousto-optic reflector of Huang, it would be inherent that an optical fiber that has a microbend and a transverse acoustic wave will simultaneously compress and strain a portion of the fiber Bragg grating.
- As to claims 13-15, an optical waveguide having an interaction region containing a fiber Bragg grating, a cladding, a core and an acoustic wave exciter,
- As to claim 16, a fiber Bragg grating that is continuous from a first portion to a second portion; and
- As to claims 18-20, said exciter includes an acoustic wave amplifying member, a signal generator comprising a transducer (20) and an acoustic wave generator comprising an acoustic horn (22, Figure 4)
- As to claim 29-30, the wave exciter generates both compressional and transverse waves.
- As to claim 32, the optical waveguide contains a tapered region and the interaction region is located within the tapered region (Figure 4).

- As to claim 33, the acoustic wave exciter comprises one or more acoustic wave exciters cascaded in series along the optical waveguide.

Huang et al., however, fails to explicitly disclose an offset core.

Liu et al. Discloses an acousto-optic modulator using a fiber Bragg grating with an offset core and as to claims 24 and 25, the signals are tunable based on power. Liu et al. Goes on to teach that advantages would result from such a configuration (Last paragraph of pp. 1517).

It would have been obvious at the time the invention was made to a person having ordinary skill in the art to offset the core from the center of the fiber in order to make use of the advantages taught by Liu et al.

5. Claims 6-9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Huang as applied to claim 1 above. Huang discloses an acousto-optic microbent reflector in an optical fiber with a core and a transverse acoustic wave for the purposes of coupling, but fails to explicitly disclose an optical fiber that has a core, cladding, and polarization mode with each spatial mode coupled from a first propagation mode to a second propagation mode.

It is well known in the art that an optical fiber that is subject to a transverse acoustic wave would have a core, cladding and polarization mode as an inherent property. And when coupled, would comprise transitioning energy from one spatial mode to another.

6. Claims 26-27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Huang et al., Liu et al. and further in view of United States Patent Number 6,430,342 to Kim et al.

Huang et al., Liu et al. and Kim et al. disclose acousto-optic modulated signal devices, but fails to explicitly disclose an acoustic wave absorber and heat sink affixed to said absorber.

One skilled in the art of acoustically modulated signals would be able to add an absorber and heat sink in order to dissipate unwanted acoustic waves and heat to reduce disturbances to the light input.

7. Claims 3, 22, 23 and 36 are rejected under 35 U.S.C. 103(a) as being unpatentable over Huang et al. and Liu et al. as applied to claims 1 and 34 above, and in further view of United States Patent Number 5,982,963 to Feng et al.

Huang et al. and Liu et al. disclose a means for separating an optical signal traveling in a first direction into a forward optical signal and a reflected optical signal and a means for transmitting the transverse acoustic waves and reflected optical signals with an offset core, but fails to explicitly disclose a means for routing said signals.

Feng teaches a tunable grating using an acoustic wave and an optical circulator that routes reflected signals (Figure 4) in order to monitor the reflected signal.

It would have been obvious at the time the invention was made to a person having ordinary skill in the art to modify Huang to include the optical circulator of Feng to route reflected signals for monitoring.

#### ***Claim Objections***

8. Claims 4, 11-12 and 37 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. The prior art made of record fails to explicitly disclose separation and routing of the optical signal into a forward and reflected signal, spectrally shaping the separated forward signal and transmitting the transverse acoustic wave to route a reflected signal.

***Conclusion***

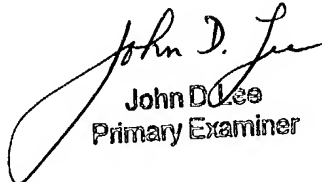
The information disclosure statement (IDS) submitted on 10/8/2003 has been considered by the examiner and made of record (note the attached copy of form PTO-1449).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Eric Wong whose telephone number is 703-305-4741. The examiner can normally be reached on Monday through Friday, 830AM - 430PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Rodney Bovernick can be reached on 703-308-4819. The fax phone number for the organization where this application or proceeding is assigned is 703-308-7724.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0956.

EW

  
John D. Lee  
Primary Examiner